Mole Control

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Moles belong to the Order of mammals called Insectivores, the insect eaters, though they are often incorrectly lumped with the "rodents," which include mice, rats, squirrels, and other gnawing mammals in the Order Rodentia. Moles are found throughout the eastern half of the United States and on the Pacific Coast. Of the eastern forms only the common mole, *Scalopus aquaticus,* is numerous and widespread, ranging from Massachusetts to Florida west to Minnesota, Nebraska, and Texas.

In the Pacific Coast states four kinds of moles are found. Three of these belong to a single genus, *Scapanus.*

Townsend's mole, *Scapanus townsendii,* black to brownish black in color and approximately 6 to 9 inches in total length, is the largest and causes the greatest damage to lawns, gardens, and croplands. This mole is common in the moist fertile soils west of the Cascades in Oregon and Washington and is also present in a small area in southern British Columbia and in northwestern California.

The Broad-Handed mole, *Scapanus latimanus,* is somewhat smaller than Townsend's mole, more silvery gray or coppery brown in color, and is found from the Klamath Basin of south-central Oregon, southward throughout much of California except for the drier desert regions.

The Coast mole, *Scapanus orarius,* about half as large as Townsend's mole, occupies much of the same area as its larger relative, but is found farther eastward in Oregon and Washington and northward into southern British Columbia.

The fourth mole, *Neurotrichus gibbsii,* or "Shrew-Mole," is blackish in color and about the size of a common house mouse. It closely resembles the shrews in appearance and habits. Present throughout the coastal lowlands from California to British Columbia, it is not abundant and is no problem to the home gardener, orchardist, or farmer. As an insect feeder, probably it is beneficial rather than harmful and is not included in this review of methods and procedures for controlling the three larger moles.

Though differing slightly in size, color, and distribution, Townsend's, Broad-Handed, and Coast moles have much in common. All have rounded or cylindrical bodies with pointed, somewhat pig-like snouts and short, bare or sparsely haired tails. Their wide, outwardly turned front palms are armed with strong nails and seem to attach directly to each shoulder. Eyes are tiny and well concealed in the short, dark velvet-like fur. External ears are not present. Moles use their sensitive snout, tail, and perhaps sensory hairs as an early warning system to detect enemies or to locate food. A single litter is born in March or April, averaging 3 or 4 naked young. Young moles mature quickly and are fully furred, nearly adult size, and on their own in about a month. Average life span is about 3 years. Moles do not hibernate, but are active throughout the year. Surface activity slows during periods of extreme cold or drouth.

Mole Damage

Moles feed on insects and insect larvae, but nearly three-fourths of their normal diet is earthworms. Moles may eat or damage tulips, lilies, iris, carrots, potatoes, peas, beans, corn, oats, wheat, and many other plants. Individual moles may feed heavily on such items. As much as 20 percent of the diet of Townsend's mole is plant material.

Some losses are caused by the mole's eating habits, but the primary damage results from burrowing and mound-building activities.

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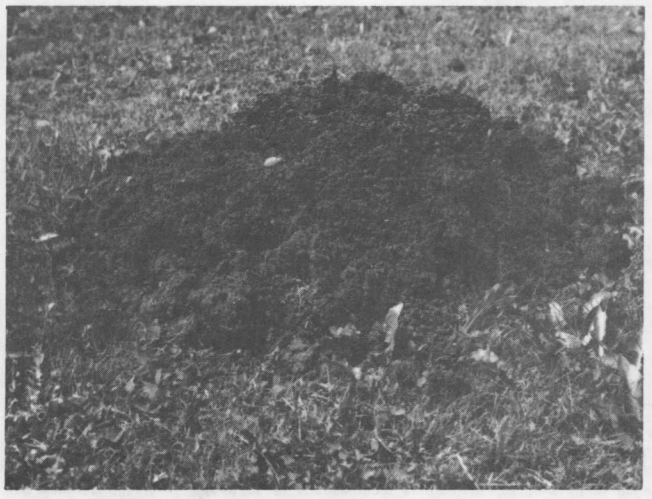
Mole mounds and burrow systems:

- Cover pasture grasses and legumes, reducing production by as much as 50 percent.
- Make harvesting difficult by plugging or breaking harvesting equipment.
- Contaminate hay and silage with dirt, which retards proper curing.
- Make ideal seedbeds for undesirable grasses and weeds.
- Create ready-made homes for field mice.
- Damage and disfigure lawns and flower beds.
- Expose shallow-rooted shrubs and plants to drying and to insect pests.

Moles are rarely seen unless captured in traps or killed while burrowing near the surface. Evidence of their presence, however, is apparent in the form of mounds of loose soil pushed to the surface. Moles seem to be continuously excavating new tunnel systems or extending old ones. They dispose of the excess soil by digging a short lateral tunnel to the surface and shoving the soil out on top of the ground. The resulting mounds, though superficially resembling those of pocket gophers, are usually more rounded and symmetrical. The mounds are built up, volcano fashion, by repeated "eruptions" of soil pushed up through the center of the pile. Pocket gophers usually push soil out to one side and the result is a flattened semi-circle or fan-shaped mound, with the plugged exit hole at one side of the pile. Thus, though similar, the workings of these two small earth movers are noticeably different, an important distinction that must be made if proper control of either pest is to be accomplished.

Moles dig two kinds of tunnels, but unlike the eastern moles, western moles make fewer subsurface tunnels or ridges. These are the shallow passages formed when the mole "swims" through the upper 2 or 3 inches of loosely packed soil in newly tilled and seeded lawns, pastures, grain fields, gardens, and flower beds in its never-ending search for food. The conical mounds of soil that characterize the deeper, more permanent, tunnel system are lacking. Unlike the deeper tunnels, these "feeder runs" are seldom used again, so, are poor choices for applying control methods.



Mole mounds are round, with dirt forced up in a cone from the center; never an open hole.

Pocket gopher mounds are fan shaped, with dirt thrown in one direction, with open hole or plugged closure at one side.

The burrow system is a vast network of interconnecting tunnels and passages, varying in depth from 3 to 30 or more inches. Moles are active throughout the year and make regular use of the tunnels from 6 to 10 inches deep. During periods of severe cold or extremely dry weather, earthworms become scarce in the upper surface layers of soil and moles move into the deeper tunnels in search of food. At such times surface burrowing and mound-building activities are minimal and control measures may be less effective.

The number of mounds or ridges in any given area does not indicate the number of moles present. A single Townsend's mole may construct from 50 to 100 mounds in a month. In coastal dairy pastures of Tillamook County, Oregon, densities vary from one mole in 6 acres to more than five per acre, but average only about two per acre. Some of these pastures appear to have been "plowed" by the moles, yet the mounds are caused not by hundreds of moles but by relatively few. Control usually can be accomplished by persistent and careful use of poisoned baits and well-set traps.

Urban dwellers, frustrated by this pesky little animal and dirt piles that pop up overnight in lawn, garden, or flower beds, can take comfort in the fact that usually only one or two moles are present and that they can be eliminated.

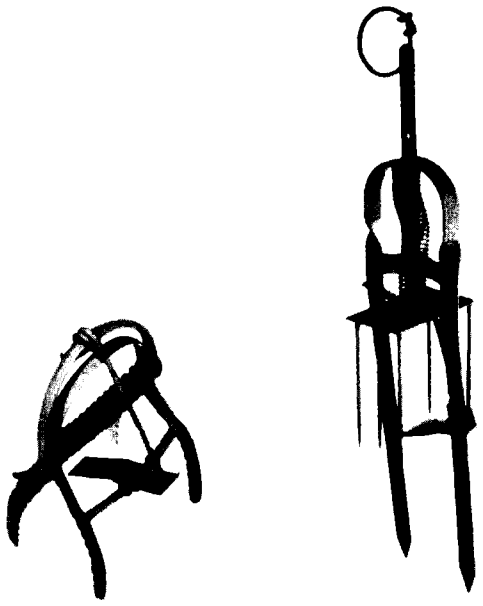
Recommended Controls

You can control moles effectively by the proper use of poisoned baits or traps or a combination of both methods. Traps are often recommended for moles in home garden, lawn, or flower beds as generally only a few moles are involved. For larger areas such as fields, pastures, and golf courses, properly placed poisoned baits are usually more effective and less time consuming. For either situation, baiting may prove to be the simpler and quicker method, with traps used as a follow-up to eliminate any animals that avoid the baits.

Trapping

In the Pacific northwest the scissors-jaw (Out 'O Sight) mole trap is recommended. By using a probe or iron rod, locate one of the mole's main underground tunnels. Usually these are 6 to 10 inches beneath the surface. Probe between two fresh dirt mounds, or a foot or more from a single mound, to insure finding a main tunnel and not a lateral or side tunnel. Using a garden trowel or small shovel remove a section of sod and soil slightly larger than the trap width (about 6 inches). The success of this trap depends on building a firm plug of soil in the center of the opened runway for the trigger pan to rest on. Moist soil from the opened tunnel or from a nearby fresh mound can be pinched together to build the plug. The set trap (with safety catch in place) is then wedged firmly into the opened burrow with the trigger snugly against the top of the dirt plug. Take care when placing the trap that the open trap jaws straddle, but do not protrude into, the open ends of the mole's tunnel. A carelessly set trap will often cause the suspicious mole to back up and burrow around or under it. Now place small chunks of sod or sift loose dirt onto the set trap to about the level of the coil spring. This excludes light from the opened burrow and makes the mole less suspicious of the plugged tunnel. *Release the safety catch* and the trap set is complete. When digging through the plug to re-open its blocked burrow the mole springs the trap and is caught. (By contrast, when trapping pocket gophers, leave the burrow system open, with the gopher trap in place. The gopher springs the trap when it replugs the open tunnel with soil.)

The "harpoon" or "spear" type trap (Victor mole trap), commonly used in the eastern states, is not as satisfactory for catching western moles. It will work if set on a dirt plug in the deeper tunnels as illustrated for the Out 'O Sight trap. The Diamond-jaw and the Choker-loop mole traps are also effective for catching moles but are seldom carried by supply stores.

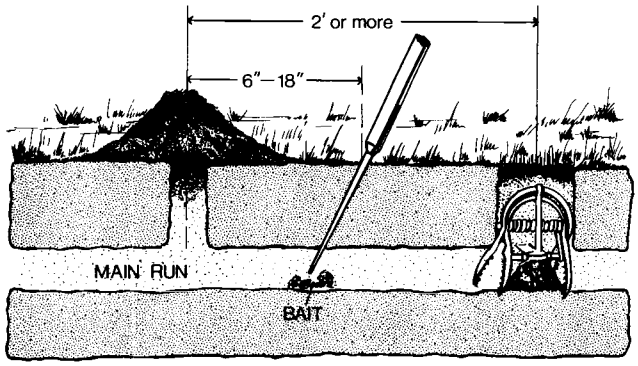


The scissors-jaw (Out 'O Sight) mole trap (left) is recommended in the Pacific northwest. The "harpoon" or "spear" type trap (Victor mole trap) on right is not as satisfactory for western moles.

Poisoned baits

The senses of taste, smell, and touch are important to moles for locating and identifying food. Therefore, effective rodenticides for controlling moles should be odorless and tasteless, or at least not objectionable to the mole. Chlorophacinone (RoZol) appears to be such a rodenticide. Chlorophacinone is an anticoagulant and may require more than a single feeding to be lethal. A single baiting will often kill most of the moles, but additional baits may be required as a follow-up to get complete control. Strychnine, an extremely bitter tasting compound, is not as readily accepted by western moles and is less effective. Baits containing more than 0.5 percent strychnine must carry a restricted-use label and can be purchased only by persons certified to use restricted-use chemicals. Rozol baits are not restricted.

Proper bait placement is the key to success. As when trapping, locate a main runway with a probe or iron rod. Rotate the probe gently to enlarge the hole and drop a teaspoonful of bait into the hole so it falls to the floor of the underground tunnel. Close the hole with a clod or by gently pressing with the heel of your shoe so loose dirt does not filter through to cover the bait. Three or four bait placements in the area of freshest mounds are enough. Don't expect instant success. If additional new mounds appear after several days, rebait. Remember, the mole must first find the bait in its maze of underground tunnels, then feed on it. Anticoagulant baits may require a second feeding to be effective.



To bait moles, probe to locate a main runway, enlarge the hole by rotating the probe, drop bait through the probe hole, and close the hole to exclude light. The proper way to set a scissors-jaw mole trap is shown. Note plug of dirt in center with trigger pan resting firmly on it. Sift loose soil or place small pieces of sod around trap jaws to level of coil spring to exclude light.

Other Control Efforts

Poison gases

Poison gases, some marketed as "gas bombs," are sometimes claimed to be effective for controlling moles. Among the chemicals used are calcium carbide, methyl bromide, carbon monoxide (motor exhausts), and carbon disulfide. Gases are not recommended for controlling moles. In the extensive tunnel system the mole can usually plug and seal off the gassed section quickly and go on its way to extend tunnels into new areas. If the mole stops working in your yard you may have only driven it under the fence to plague your neighbor. Perhaps that, too, is a satisfactory method of control; at least until your neighbor tries it and drives the mole back.

Flooding and fumigants

Flooding the burrow system with a garden hose is rarely effective. Unless you can flood the entire burrow system quickly and completely, which is seldom possible, you may only stimulate the mole to tunnel in other parts of your yard.

Insecticides or soil fumigants used to eliminate earthworms and soil-dwelling insects may cause moles to move to nearby areas where this food source is more plentiful. A partial removal of earthworms may only cause moles to increase their tunneling and burrowing in search of food. Generally this is more expensive and less effective than eliminating moles by the more direct methods of poisoning or trapping.

Shooting

Some farmers have found the 12 gauge shotgun an effective tool in rural areas where this method can be applied safely and legally. Drag the fields or pastures to flatten all old mounds, then simply patrol until a fresh push-up indicates a mole repairing the damaged burrow system. When movement is detected in the newly formed mound a well aimed blast, from close range, does the rest. The mole is either killed directly by the shot charge or indirectly by concussion. A hard blow with a long handled shovel, directed at the moving dirt pile, will sometimes accomplish the same end.

Gimmicks and Gadgets

Nearly everyone has heard of a sure-fire remedy for controlling pest animals, especially moles. In this category are the many and varied materials recommended for placement within the burrow system. In theory such things cause the mole to die or at least pack up and leave. Such cures include broken bottles, ground glass, razor blades, thorny rose branches, bleaches, various petroleum products, moth balls, sheep dip, common household lye, and even human hair. When these fail, as they will, you can rely on mole wheels, windmills, bleach bottles with wind vents placed on sticks, and other similar gadgets. Though colorful and sometimes decorative, these add nothing to our arsenal of effective mole control methods.

Another cure-all is the so-called "mole plant" or caper spurge, *Euphorbia lathtrus*. When planted frequently throughout lawn and flower beds such plants are supposed to serve as living repellents. Not so!

In the past few years, several electromagnetic devices or "repellers" have been marketed for the control of rats, mice, gophers, moles, ants, termites, and various other pests. The claimed effects upon rodents include cessation of feeding and reproduction, disorientation, and dormancy or death by dehydration. These same devices were reported to have no harmful effects on domestic livestock, cats, dogs, bees, earthworms, or other "useful" animals or insects. Laboratory tests, some commissioned by the Environmental Protection Agency, have proved no such results possible. A stop-sale order against the manufacturers of several of these devices has been ordered by EPA. These devices have no noticeable effect on moles.

Unfortunately, there are no "short cuts," no "magic wands" when controlling moles. Just as in the control of plant, insect, or other animal pests, success involves knowing something about the animal and its living habits, then continuous, persistent application of tested and proved methods and materials. Mole traps and recommended poison baits, properly placed, are the two most effective methods for controlling western moles.